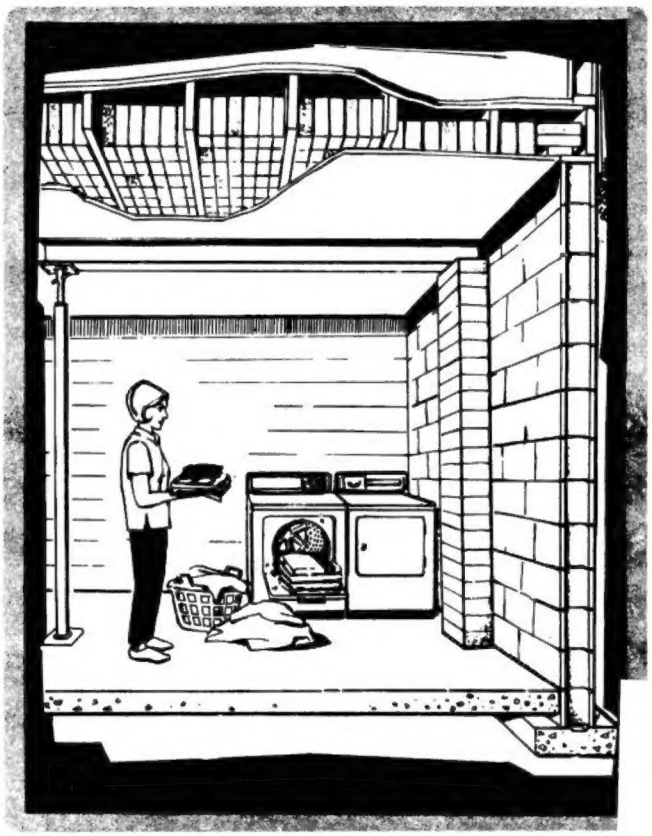
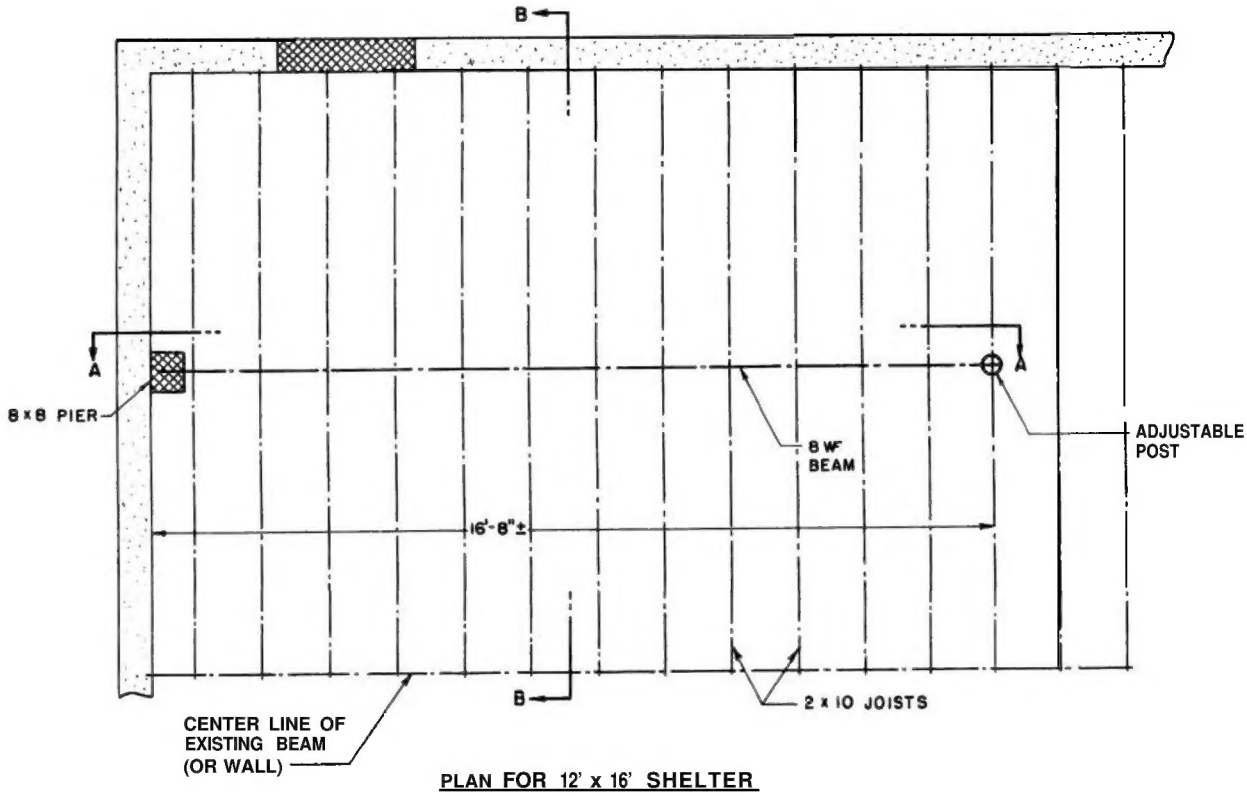
H-12-A
April, 1980



Protection is provided
in a basement corner
by bricks
or concrete blocks
between the overhead joists.
A beam
and jack column
support the extra weight.

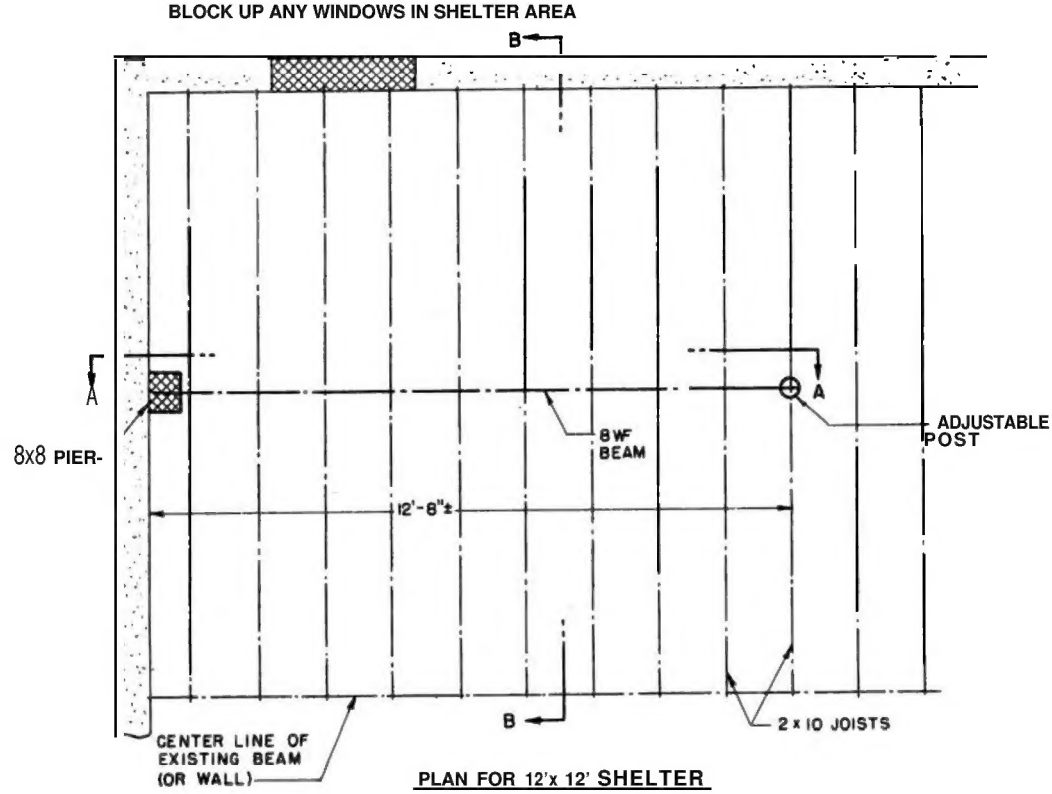
HOME FALLOUT SHELTER
modified ceiling shelter-basement location plan a

FEDERAL EMERGENCY
MANAGEMENT AGENCY

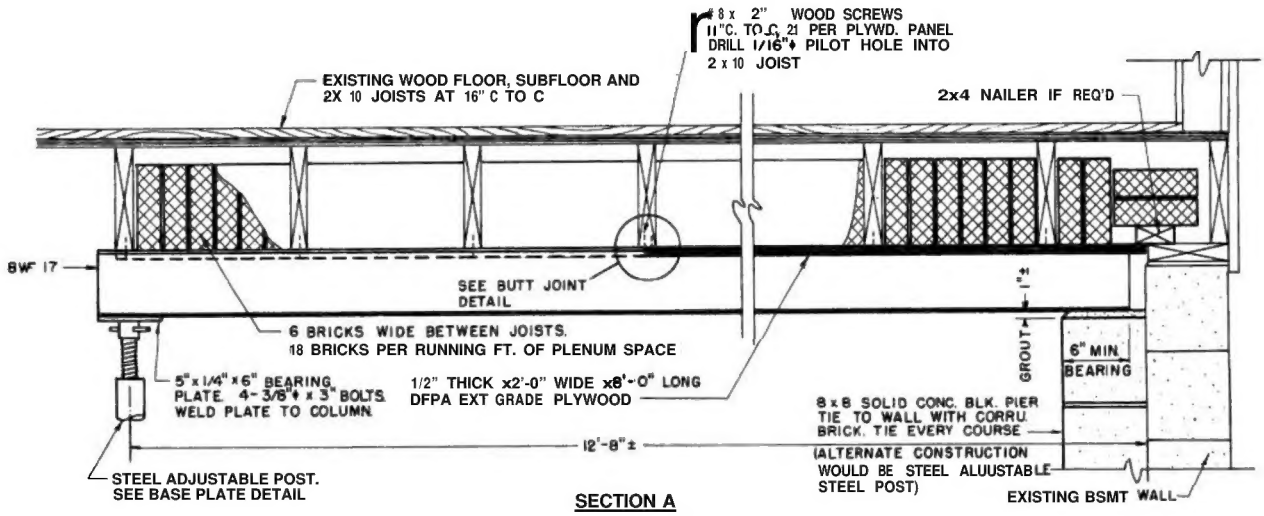


PLAN FOR 12' x 16' SHELTER

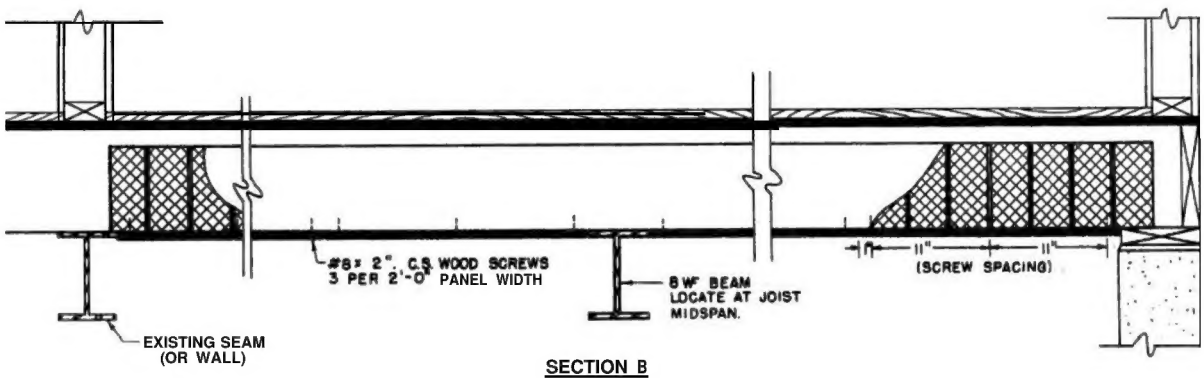
BLOCK UP ANY WINDOWS IN SHELTER AREA



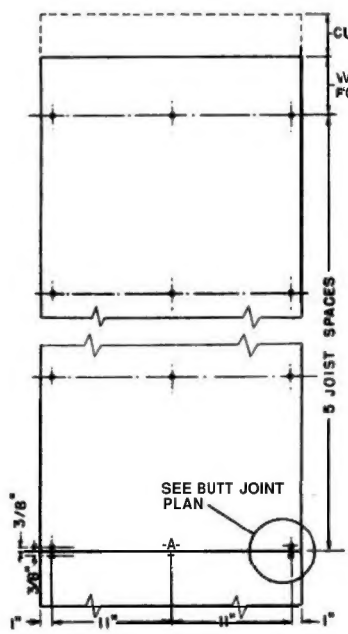
PLAN FOR 12'x 12' SHELTER



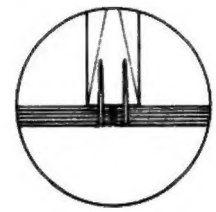
SECTION A



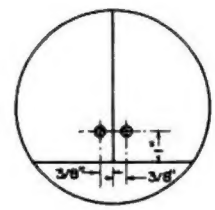
SECTION B



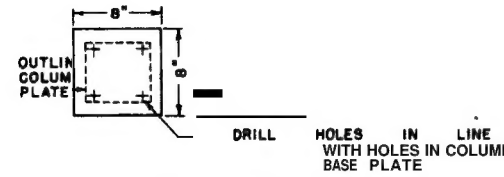
PLAN OF TYPICAL PLYWOOD CEILING PANEL



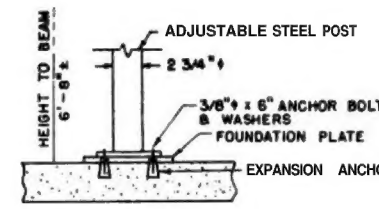
BUTT JOINT DETAIL



BUTT JOINT PLAN.



FOUNDATION PLATE PLAN



BASE PLATE DETAIL

CAUTION

This home fallout shelter design should only be constructed in low risk areas. A low risk area is one which is not expected to be subjected to the blast effects of a nuclear weapon. It is suggested you contact your State or local civil preparedness director for information concerning the type of area you live in, i.e., low risk or high risk area.

GENERAL INFORMATION

This shelter can be permanently installed in the basement of your home and will not interfere with its utility in any way.

In basements whose walls are mostly below grade on all four sides, adequate shelter from fallout radiation is provided by modifying the overhead floor joist and ceiling construction as shown in the drawings. The plywood, which is screwed to the bottoms of the joists, supports the masonry shielding material and provides a solid base for a more decorative ceiling treatment. A beam and jack post are used to support the extra weight. Approximately 2 man days are required to construct the ceiling.

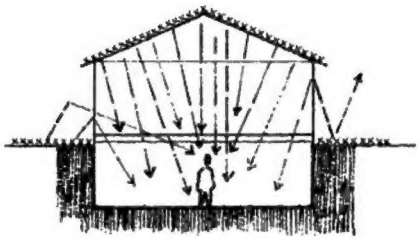
SHELTER SIZE

The plans on the preceding pages show two sizes of shelters of this type - **a 12' x 16'** size, which may be suitable for use in many one story homes, and a **12' x 12'** size, which is suitable for use in many two story homes.

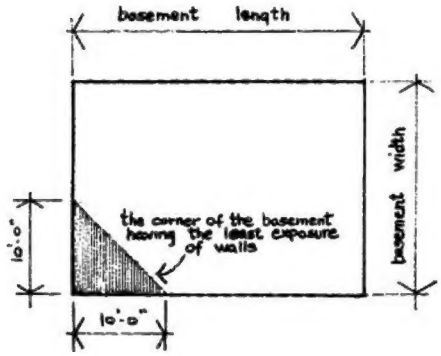
On the following pages, under LIMITATIONS OF THE CEILING MODIFICATION SHELTER IN BASEMENTS, you will find illustrations of the conditions which make this type of construction an effective shelter, and some additional things that must be done if these conditions are not met by your particular basement situation.

Note that if some joist spaces contain heating ducts, or are closed in with sheet metal to serve as return air ducts, the protection in this area of the shelter is reduced since bricks or blocks cannot be placed as shown in the drawings.

LIMITATIONS OF THE CEILING MODIFICATION SHELTER IN BASEMENTS

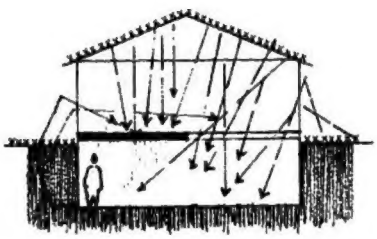


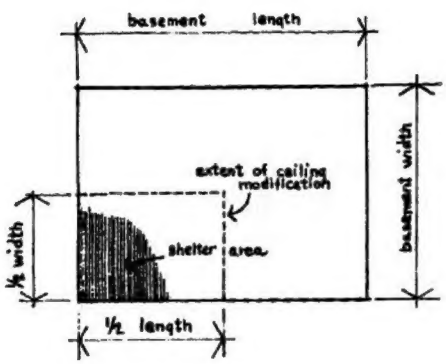
This cross-section of a one story house shows radiation coming into the basement from fallout particles on the roof and the ground, Most of the radiation comes from the roof because of the shielding effect of the ground outside the basement walls.



The shaded area in the basement floor plan shows the location of the best potential shelter area (approximately 50 square feet). The drawings on the preceding pages are for the adding of bricks or blocks in the ceiling over this best corner.

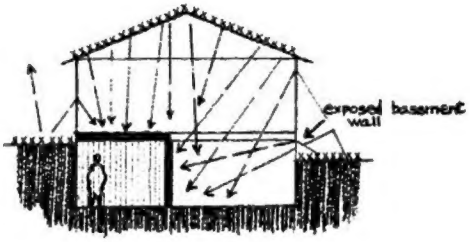
This placement of added weight in the proper portion of the basement ceiling will considerably improve the protection in the best corner. Note that is not necessary to add this weight to the entire ceiling area.

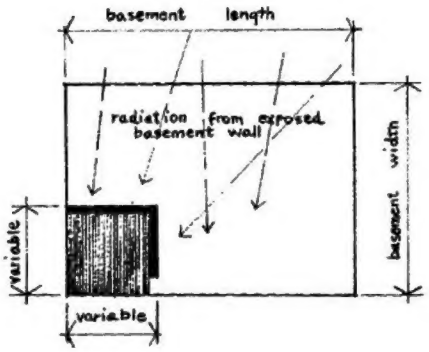




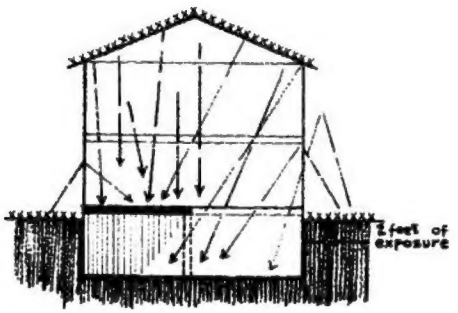
The extent of the ceiling modification area depends on the type of house (i. e., one or two story), the dimensions of the basement, and the amount of basement wall exposure. In a one story house, approximately one - quarter of the area of the basement ceiling should be filled with the concrete blocks or bricks in order to obtain the most protection out of this improvement.

This arrangement will effectively shield all of the radiation coming from the roof - the largest contributing source.





If it is found to be impractical to shield one quarter of the basement ceiling area, the extent of ceiling modification may be reduced to any desired size by constructing vertical masonry walls on the two open sides of the shielded area, thus providing a room suitable for use as a hobby or laundry room. These masonry walls will also provide protection from excessive amounts of radiation coming through exposed portions of the basement wall.



In homes with 2 or more stories above ground, the extent of the basement ceiling modification can usually be reduced to 12' x 12'. Note, however, that vertical side walls may be required if the basement wall exposure exceeds two feet.

Adding bricks or blocks to the basement ceiling can also create shelter in certain portions of the basements of split-level houses. It is recommended that expert advice be sought for basement situations which do not fit the plan sizes or illustrations in this pamphlet.

The MATERIALS LIST shows quantities for the two plan sizes shown. If additional materials are required for the building of shielding walls in an emergency, they must be added to the list.

MATERIALS LIST Item	Actual Number Required For 12' x 16' Size	Actual Number Required For 12' x 12' Size
Masonry :		
4" x 8" x 16" solid concrete blocks or	432 blocks or	330 blocks or
2-1/4" x 4" x 8" bricks	2492 bricks	1978 bricks
8" x 8" x 8" solid concrete blocks (standard stone aggregate no-sand forming)	10	10
Mortar:		
prepared dry-mix bags	1 bag	
Plywood sheets: (cut to fit exact basement dimensions)		
1/2" 5-ply Utility B-C grade, good one side.		
2'-0" x 8'-0" sections	12	6
2'-0" x 4'-0" sections		6
Steel:		
8WF17 Beam (Determine length from basement dimensions). Maximum span 16'-0" *	1	
Adjustable steel posts with tubes 13 ga., top tube 2-1/2", bottom tube 2-3/4" with 5" x 6" x 1/4" plate welded to each end.	1	
8" x 8" x 3/8" extra base plate, 4-7/16" holes in each plate.	1	
Hardware :		
3/8" x 3" sq. head unfinished bolts each with 2 washers and nuts	4	4
3/8" x 6" sq. head unfinished bolts each with 1 washer and nuts	4	4
3/8" size multiple-expanding machine bolt anchors hole size is 3/4" x 2-7/8"		
Corrugated brick ties, galvanized steel 23 ga., 7/8" x 7"	16	16
#5 screw gage size lead insert shields, hole size 1/4" x 1-1/2"	16	16
#5 x 1-1/2" unfinished wood screws	16	16
#8 x 2" cad. plated wood screws, c. s.	260	195

Special tools :

1/4" and 3/4" star drills to install anchoring devices

*Greater depth required for longer spans

CONSTRUCTION SEQUENCE

1. Drill holes in block wall for lead insert shields and attach corrugated ties with screws, two per mortar joint.
2. Lay up 8" x 8" masonry pier against wall, tying pier to wall with corrugated ties.
3. Locate and drill for machine bolt anchors in basement floor using base plate of jack post for template.
4. Thoroughly coat under side of foundation plate with rust-inhibiting paint.
5. Place foundation plate and base plate of jack post over anchors and drive anchor bolts tight.
6. Lower jack and bolt one end of steel beam to top plate, resting other end temporarily on top of pier.
7. Raise jack to level position of beam, shimming under pier end to a snug fit under the joists.

   PRECAUTIONARY NOTE: Excessive tightening of the jack post at this point may cause undue stress in the joists and slab, as the ceiling spaces are filled. Make several adjustments in the post as the material is added.

8. Grout mortar under beam at pier.
9. Cut plywood into 2 ' x 8' sheets.
10. Starting at wall, attach plywood to joist bottoms, using 2" #8 screws.
11. Remove cross bridging, if any, from existing joist spaces.
12. Fill the joist spaces with blocks or bricks.
13. Repeat steps 10, 11 and 12 for each of the other sheets.

Before constructing the shelter described here, you should check to see that the construction conforms to your local building codes, and whether a building permit is required.

If work is to be done by a builder or contractor, it is recommended that firms be retained that carry necessary insumnce and guarantees to properly protect the owner against subsequent liability and claims on the work and to ensure satisfactory results. Members of the National Association of Home Builders and the Associated General Contractors meet these and other requirements of protection for the home owner.

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